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3051991395

COMPUTER SCIENCE **0478/11**

Paper 1 Theory **May/June 2021**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [ ].
- No marks will be awarded for using brand names of software packages or hardware.

This document has **16** pages. Any blank pages are indicated.

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1 Benedict has a computer that is assigned an Internet Protocol (IP) address. The IP address is:

198.167.214.0

The IP address is represented as denary values.

(a) Convert the denary values 167 and 214 from the IP address to 8-bit binary.

167								

214								

Working space

.....

.....

.....

..... [2]

(b) Benedict's computer is also assigned a Media Access Control (MAC) address.

(i) Identify **one** similarity between an IP address and a MAC address.

.....

..... [1]

(ii) Identify **two** differences between an IP address and a MAC address.

Difference 1 .....

.....

.....

Difference 2 .....

.....

..... [2]

2 Julia inputs personal data into her computer.

She stores three copies of the data using a hard disk drive (HDD), a solid state drive (SSD) and a USB flash memory drive.

(a) Identify **three** devices Julia can use to input personal data into her computer.

Device 1 .....

Device 2 .....

Device 3 .....

[3]

(b) Six statements are shown about HDDs, SSDs and USB flash memory drives.

Tick (✓) to show which statements apply to each type of storage. Some statements can apply to more than one type of storage.

Statement	HDD (✓)	SSD (✓)	USB flash memory drive (✓)
it has no moving parts			
it is non-volatile			
it can use NAND gates to store data			
it uses magnetic properties to store data			
it has the smallest physical size			
it has the slowest read/write speeds			

[6]

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(c) Julia uses a USB connection to transfer data onto her USB flash memory drive.

(i) One benefit of using a USB connection is that it is a universal connection.

State **two** other benefits of using a USB connection.

Benefit 1 .....

.....

Benefit 2 .....

.....

[2]

(ii) Identify the type of data transmission used in a USB connection.

..... [1]

3 A firewall can be used to help keep the data secure that is stored on a computer.

(a) The given paragraph describes how the firewall operates to help keep the data secure.

Complete the paragraph using the most appropriate terms from the given list. **Not** all of the terms on the list need to be used.

- Accept
- Criteria
- Hacking
- Input
- Network
- Outgoing
- Output
- Processor
- Reject
- Software
- Store
- Storage

A firewall can be ..... or hardware based. It monitors traffic between the computer and the ..... The user sets ..... for the traffic. The firewall will ..... or ..... the traffic based on this. It can help prevent ..... and malicious software that could be a threat to the security of the data.

[6]

(b) Identify **three** other methods that could be used to keep the data secure.

Method 1 .....

Method 2 .....

Method 3 .....

[3]

4 Two internet risks are phishing and pharming.

Describe what is meant by phishing and pharming.

Phishing .....

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.....

.....

.....

.....

Pharming .....

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.....

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.....

[6]

5 Jamelia has a greenhouse that she uses to grow fruit and vegetables. She needs to make sure the temperature in the greenhouse stays between 25 °C and 30 °C (inclusive).

A system that has a temperature sensor and a microprocessor is used to maintain the temperature in the greenhouse. The system will:

- open a window and turn a heater off if it gets too hot
- close a window and turn a heater on if it gets too cold.

Describe how the system uses the temperature sensor and the microprocessor to maintain the temperature in the greenhouse.

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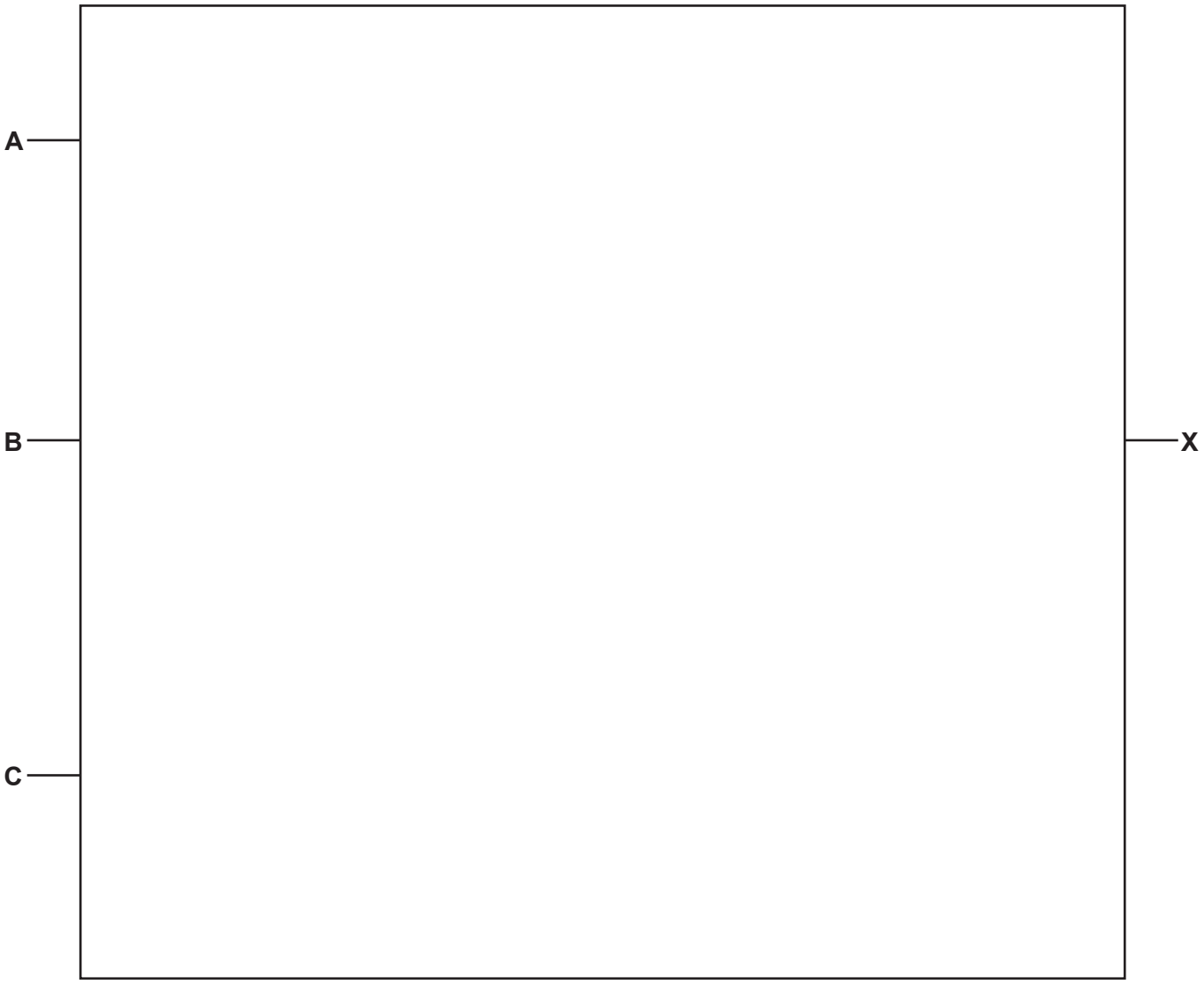
..... [8]

6 Consider the logic statement:

X = (((**A** AND **B**) OR (**C** AND NOT **B**)) XOR NOT **C**)

(a) Draw a logic circuit to represent the given logic statement.

Do **not** attempt to simplify the statement. All logic gates must have a maximum of two inputs.



[6]

(b) Consider the completed truth table for the given logic statement.

Row number	**A**	**B**	**C**	Working space	**X**
1	0	0	0		**0**
2	0	0	1		**1**
3	0	1	0		**0**
4	0	1	1		**1**
5	1	0	0		**0**
6	1	0	1		**1**
7	1	1	0		**0**
8	1	1	1		**1**

There are four errors in the truth table in the output (X) column.

Identify the **four** incorrect outputs.

Write the row number to identify each incorrect output.

Row .....

Row .....

Row .....

Row .....

[4]

7 A music company has a website that allows users to stream music. The music is stored in sound files.

(a) The sound files are compressed using lossless compression.

(i) Describe how the sound files are compressed using lossless compression.

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..... [4]

(ii) State **one** reason why the music company would compress the sound files using lossless, rather than lossy, compression.

.....

..... [1]

(iii) Give **one** benefit, to the user, of the music company compressing the sound files.

.....

..... [1]

(iv) Give **one** drawback of the music company using lossless, rather than lossy, compression for the sound files.

.....

..... [2]

(b) Describe how the web pages for the website are requested and displayed on a user's computer.

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..... [4]

(c) The web server that hosts the website suffers a denial of service (DoS) attack.

Explain why this will prevent users from accessing the website.

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..... [2]

8 Four 7-bit binary values are transmitted from one computer to another. A parity bit is added to each binary value creating 8-bit binary values. All the binary values are transmitted and received correctly.

(a) Identify whether each 8-bit binary value has been sent using odd or even parity by writing odd or even in the type of parity column.

8-bit binary value	Type of parity
01100100	
10010001	
00000011	
10110010	

[4]

(b) An error may **not** be detected when using a parity check.

Identify why an error may **not** be detected.

.....

..... [1]

(c) The data is sent using parallel half-duplex data transmission.

(i) Describe how data is sent using parallel half-duplex data transmission.

.....

.....

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.....

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.....

..... [4]

(ii) State **two** drawbacks of using parallel data transmission.

Drawback 1 .....

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Drawback 2 .....

.....

[2]

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